Code No. 7007

# FACULTY OF SCIENCE

B.Sc. I-Semester (CBCS) Examination, December 2017
Subject: Statistics
Paper – I: Descriptive Statistics and Probability

Time: 3 Hours Max. Marks: 80

## PART – A (5 x 4 = 20 Marks)
(Short Answer Type)
**Note: Answer any FIVE of the following questions.**

1 Explain Schedule.
2 Explain Kurtosis.
3 Write the condition for mutual independence for 4 events.
4 Define Axiomatic definition of probability.
5 Define (i) Probability mass function (ii) Probability density function
6 If $\begin{cases} 2x & 0 < x < 1 \\ 0 & otherwise \end{cases}$
Find pdf of y = 2x + 1.
7 State and prove Cauchy-Schwartz inequality.
8 If X is random variable, then var (ax + b)= $a^2$ Var (x), where a and b are constants.

## PART – B (4 x 15 = 60 Marks)
(Essay Answer Type)
**Note: Attempt ALL the questions.**

9 (a) What are various methods of collecting statistical data? Which is more reliable and why?

OR

(b) Establish the Relationship between central moments interms of Raw moments. Hence, obtain the first four moments.

10 (a) State and prove addition theorem of probability for 4 events.

OR

(b) (i) If A and B are independent, then show that $\bar{A}$ and B are independent.
(ii) State and prove Bayes theorem. Give its importance.

11 (a) Define Random variable. A random variable X has the following pmf.

| x=x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| P(x=x) | 0 | k | 2k | 2k | 3k | $k^2$ | $2k^2$ | $7k^2+k$ |

(i) Find K (ii) P (x ≤ 5), P(0 < x ≤ 3) (iii) If P (x ≤ x) > ½ , find the minimum value of x.

OR

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(b) Define Joint probability density function,. The Jpdf of x and y is

$$f(x,y)=\begin{cases} e^{-(x+y)} & x>0,\ y>0 \\ 0 & otherwise \end{cases}$$

(i) Verify whether x and y are independent (ii) p (x < 1) (iii) p (y > 2) (iv) P(x > 2, y < 3)

12 (a) (i) State and prove multiplication theorem of mathematical expectation.

(ii) Two unbiased dice are thrown. Find the expected value of the sum of number of points on them.

OR

(b) (i) Define cumulant generating function. Find the Relation between cumulants and moments.

(ii) Find the mgf of $y=\frac{x-m}{\sigma}$

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